

REMARKS

Please note that the trademark "COSMO" is capitalized in the specification, and referred to generically as a transfer molding apparatus.

Rejections Under 35 USC §103

Claims 1-25 have been rejected under 35 USC §103(a) as being unpatentable over Applicant's Prior Art Figure 1 in view of Bolken (US Patent Publication #2002/0186549A1).

The rejections under 35 USC §103 are traversed for the reasons to follow.

Summary of the Invention

Claims 1-25 are directed to a system 40 (Figure 2A) for fabricating a semiconductor component (package 52 Figure 2D) on a substrate (leadframe 46-Figure 2B).

The system 40 (Figure 2A) includes an upper mold cavity plate 42U (Figure 2A) having a plurality of upper mold cavities 86U (Figure 2A), and a lower mold cavity plate 42L (Figure 2A) having a plurality of lower mold cavities 86L (Figure 2A). The upper mold cavities 86U (Figure 2B) and the lower mold cavities 86L (Figure 2B) are configured to engage opposing surfaces of the substrate (leadframe 46-Figure 2B). In addition, each mold cavity plate 42U, 42L (Figure 2A) includes dummy runners (110U-Figure 6) configured to channel molding compound 50 (Figure 6) into dummy mold cavities 102L, 102U (Figure 2B) on opposing surfaces of the substrate (leadframe 46-Figure 2B).

As shown in Figure 6, each mold cavity 86U, 86L (Figure 2A) also includes corner runners 106U (Figure 6) in the corners 124 (Figure 6) configured to direct the molding compound 50 (Figure 6) through the corners 124 (Figure 6) and into the dummy mold cavities 102L. The flow of molding compound 50 through the corners 124 prevents trapped air

from accumulating in the corners 124. In addition, each dummy mold cavity 102L, 102U is in flow communication with a single air vent 84U, 84L (Figure 3C), and any trapped air in the molding compound 50 is channeled through the dummy mold cavities 102L, 102U and into the air vents 84U, 84L. The runners (110U-Figure 3C) eliminate the corner air vents of the prior art molding system, such that there are fewer air vents to clean and less flash particles are produced.

Arguments

MPEP 2142, 2143 specifies that a valid 35 USC §103 rejection requires a prior art reference (or references when combined) to teach or suggest all the claim limitations. The rejections under 35 USC §103 are traversed as the combination of Applicant's prior art and Bolken does not disclose or suggest all of the limitations of the present claims.

The claimed system 40 (Figure 2A) includes corner runners 106U (Figure 6), which are configured to direct molding compound 50 (Figure 6) from the corners 124 (Figure 6) of the mold cavities 86U (Figure 3C) 86L (Figure 4C) into dummy mold cavities 102U (Figure 3C) 102L (Figure 4C). As the dummy mold cavities 102U, 102L are in flow communication with air vents 84U (Figure 3C), 84L (Figure 4C), trapped air 122 (Figure 6) is also vented from the dummy mold cavities 102U, 102L.

Neither Applicant's prior art nor Bolken, discloses corner runners. Elements 82 in Bolken were cited as being equivalent to the presently claimed corner runners. However, elements 82 are openings 82 on the substrate 12 (paragraph 49, last line), which are configured for indexing and handling the module 48 (paragraph 72, last line). In the present system, the corner runners 106U (Figure 6) are on the mold cavity plates 42U, 42L (Figure 2A), and are in flow communication with the mold cavities 86U, 86L (Figure 2A). The openings 82 in Bolken have a

different structure (openings on the substrate 12), and a different function (indexing and handling), than the presently claimed corner runners.

Admittedly, Bolken discloses openings 92 (Figure 6) "for introduction of flowable polymeric molding compound (not shown) into the mold cavity 100" (paragraph 54, next to last sentence). However, the openings 92 are not corner runners as presently claimed, and are not in flow communication with dummy mold cavities as presently claimed.

In order to further distinguish the claimed system from the prior art some of the independent claims have been amended with additional limitations. In particular, the structure and function of the corner runners and the dummy mold cavities have been more clearly defined in some of the claims.

In particular, amended claim 1 recites the limitation of "a corner runner on the plate configured to direct the molding compound through the corner". In addition, claim 1 recites "a dummy cavity on the plate in flow communication with the corner runner configured to mold a dummy segment on the substrate". The combination of Applicant's prior art and Bolken does not disclose a corner runner and dummy cavity in combination. These features of the claimed system provide an improved component because trapped air is eliminated from the molded package.

Independent claim 8 has been amended with limitations on the geometry of the corner runner. In particular, claim 8 recites "each corner having generally orthogonal surfaces" and "at least one corner runner on the plate in a surface of a corner". Antecedent basis for these recitations is contained on page 15, lines 15-20 of the specification. The combination of Applicant's prior art and Bolken does not disclose a corner runner having the stated geometry. As previously argued, improved results are provided by this geometry.

Independent claim 16 recites "a second runner on the plate configured to direct the molding compound through the cavities and to prevent air in the molding compound from accumulating in the cavities". In claim 16 the second runner is in the form of the corner runner. Claim 16 also recites "a dummy cavity in flow communication with the first runner and the second runner configured to receive the air". As argued with respect to claim 1, the combination of Applicant's prior art and Bolken does not disclose the combination of a second runner and a dummy cavity. As also previously argued, improved results are provided.

Independent claim 20 recites "corner runners" and "dummy cavities" in combination, as is allowable for essentially the same reasons as claim 1.

Independent claim 23 has been amended similarly to claim 8 with limitations on the geometry of the corner runner, and is allowable for essentially the same reasons as claim 8.

In view of the amendments and arguments, favorable consideration and allowance of claims 1-25 is requested. Should any issues remain, the Examiner is requested to contact the undersigned by telephone.

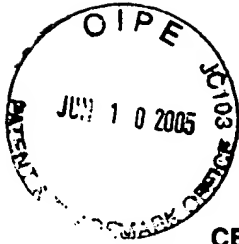
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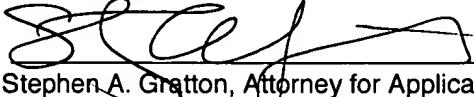
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